Reference Manual for Data Base on Nevada Well Logs

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ABSTRACT

The U.S. Geological Survey and Nevada Division of Water Resources are cooperatively using a data base for managing well-log information for the State of Nevada. The Well-Log Data Base is part of an integrated system of computer data bases using the Ingres Relational Data-Base Management System, which allows efficient storage and access to water information from the State Engineer's office. The data base contains a main table, two ancillary tables, and nine lookup tables, as well as a menu-driven system for entering, updating, and reporting on the data. This reference guide outlines the general functions of the system and provides a brief description of data tables and data-entry screens.

INTRODUCTION

The U.S. Geological Survey (USGS) and Nevada Division of Water Resources (NDWR) have developed three integrated data bases for water-rights permit information, water-use information, and well-log data. This report documents one of the three data bases, the well-log data base.

The Well-Log Data-Base system (WLog) both stores and retrieves information required by the State of Nevada for new and existing wells. The data is indexed by a well-log number that can be referenced to the water-permit and water-use data bases. WLog is written in the Ingres Fourth Generation Language (4GL) with the forms-based user-interface program, Application By Forms (ABF). The user interacts with the data base through screen menus consisting of four major components: routines for entering data and updating the data base, for making single-record queries, for compiling and producing reports, and utility routines for managing the data base. Data entry is validated using both forms-based and 4GL-based routines.

The current Ingres version of WLog was designed to replace a data base previously operated by the U.S. Geological Survey on a mainframe computer. The new data base allows the State to have greater control over data quality and data access. This gives USGS a data base that is more accessible for water-use investigations and for integration with the National Water Information System (NWIS) maintained by USGS.

The computer hardware used by the State consists of a network of non-graphics and graphics terminals connected to a UNIX-based file server. Because most users have access only to a text-based terminal, the application was developed using text-based 4GL. Coding was completed by USGS staff, working closely with NDWR staff to develop the specifications.

Purpose and Scope

This document serves as a reference guide to WLog developed for NDWR by USGS. This guide outlines the general functions of the system and provides a brief description of data tables and data-entry screens. This guide was written assuming that the user is familiar with NDWR's regulations for water-well drilling and with the contents of a well driller's report and has been instructed

in how to enter and retrieve data. This guide is not intended for the novice user and does not provide detailed instructions for data input or retrieval. It is not a programming guide and does not describe the underlying code of the data base.

Many of the concepts and terms used in this report and the data-base application are described in reports by the Nevada Department of Conservation and Natural Resources. These include "Evolution of Nevada's Water Laws, as Related to the Development and Evaluation of the State's Water Resources, From 1866 to About 1960" (Shamberger, 1991) and "Regulations for Water Well and Related Drilling" (Nevada Division of Water Resources, 1990).

WLog has been used successfully for two years by NDWR and USGS for the management of well-log information. Although the software has been tested, the USGS and NDWR assume no responsibility for errors or omissions, or for damages resulting from the use of the system.

Acknowledgments

The authors acknowledge several individuals for their contribution to WLog. James L. Farnham, Tom Gallagher, and Kim Groenewold, of NDWR helped with the data specifications. James R. Swartwood and David B. Wood, of the USGS, are the original authors of the well-log data base written for the mainframe computer. John C. Watson, of the USGS, and Bernard L. Lap, formerly of the USGS, worked on the data-base tables.

Conventions

Bold lower case text, such as **wlog_src**, is used to identify data-base table names. Bold uppercase text, such as **WELL_LOG**, is used to identify data-field names in a table. Nonbold uppercase text in quotes, such as "NOI," is used to identify report names and column headings in reports.

Computer System Requirements

The WLog currently operates on a Data General AViiON 5200 file server running a UNIX-based operating system. Ingres Relational Data-Base Management System software is required. The user interface can be executed using either a non-graphics terminal or an X-based terminal. The data-base was written for storage and management of the State of Nevada's well-log data and all data ranges and specifications are in accordance with State of Nevada and USGS requirements.

ACCESS LEVELS

WLog runs at several access levels. These levels of permission control access to the data, application routines, screen displays, and reports. The system's access levels are summarized in table 1.

Table 1. System access rights

Access level	User description	Data retrieval	Data update	Data reports	Data base optimization
0	Data-base administrator	no	no	no	yes
1	Data-entry personnel, full rights	yes	yes	yes	no
2	Public user	yes	no	limited	no

Access level zero is for the data-base administrator. The administrator can establish or modify information such as user name, access level, and default printer. The data-base administrator also can optimize the data-base tables for maximum system performance using a suite of menu options. The main menu screen displayed for a user with access level zero is shown in figure 1.
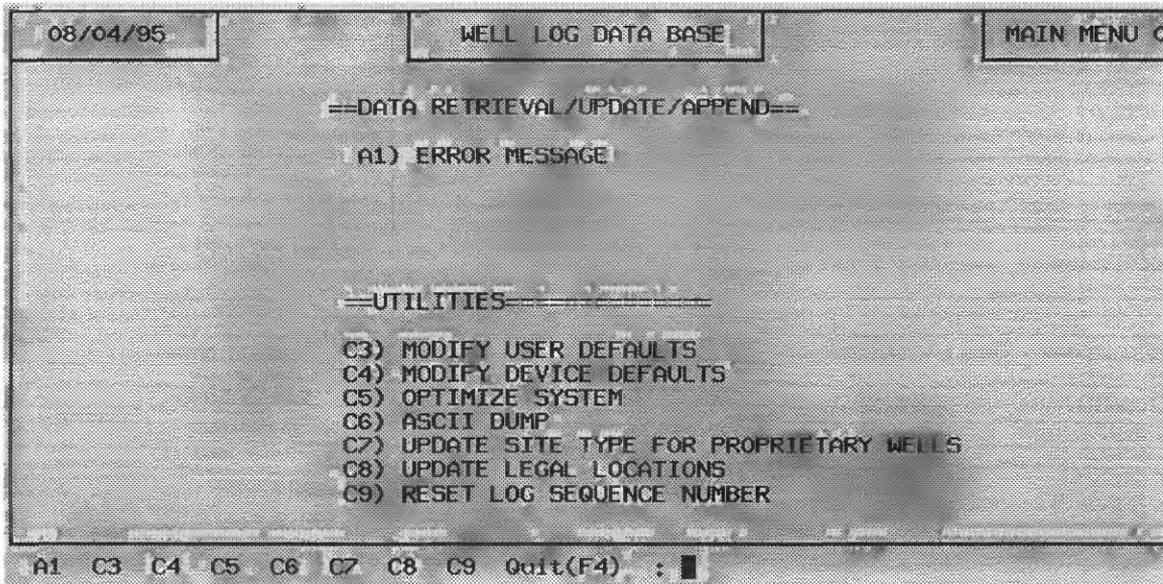
Figure 1. Main menu for user-access level zero (data-base administrator).

Access level one is for data-entry personnel who have full access. The user can perform data queries for specific records, append, and update data. Access level one also allows the user to access all available reports, including the restricted reports. The main menu screen displayed for a user with access level one is shown in figure 2.
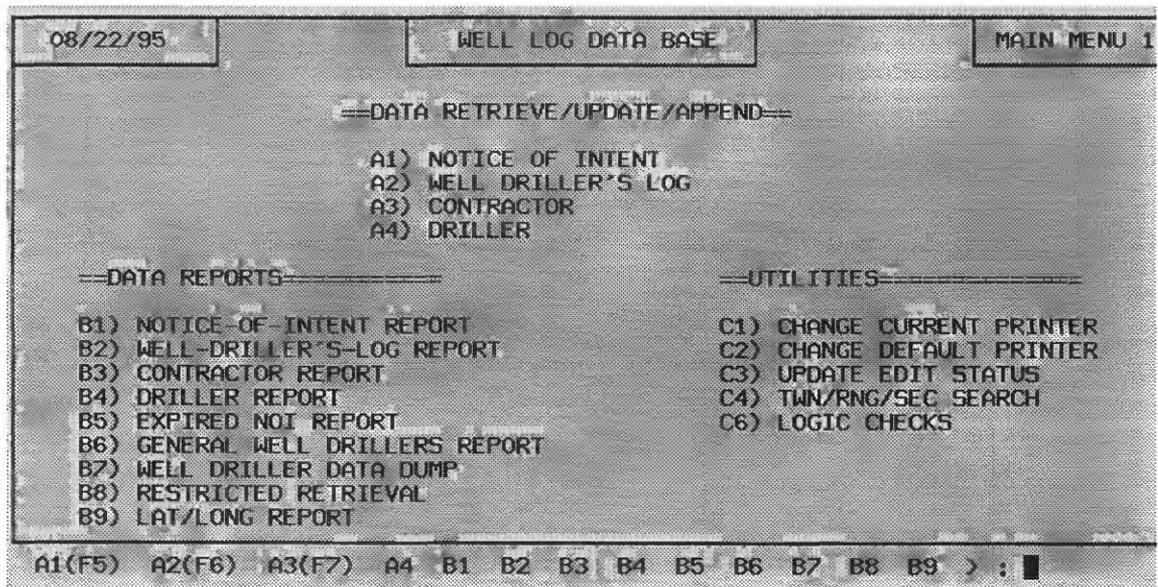
Figure 2. Main menu for user-access level one (data-entry personnel).

Access level two is for public users and is the most restricted level. The user can make only limited data queries. At this level, public users can search for well-log information by several criteria, including well-log number, application number, location, and owner's name, but are not permitted to modify the data base or view confidential information. Access level two also allows access to seven of the nine reports. The main menu screen displayed for a user with access level two is shown in figure 3.
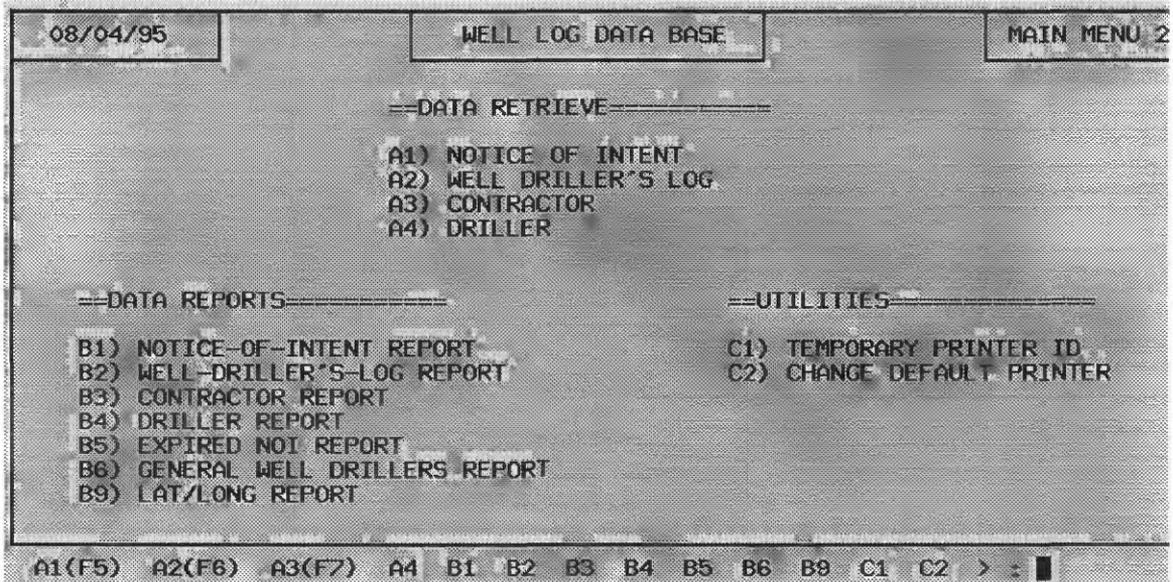
Figure 3. Main menu for user-access level two (public users).

STRUCTURE OF DATA BASE

The Ingres data base for WLog consists of a main table, two ancillary tables, nine lookup tables, and three system-maintenance tables. The main table (**wlog_src**) stores most of the well-log information. The ancillary tables (**intent_src**, and **driller**) contain information for the notice-of-intent forms and the driller at the well site. The ancillary tables are joined to the **wlog_src** table through one-to-many relations. The lookup tables (**agency_lut, basin_lut, cont_lut, county_lut, drilling_mthd_lut, proposed_use_lut, site_type_lut, test_mthd_lut,** and **work_type_lut**) give the user a list of valid codes for particular fields and provide the fully expanded name for abbreviations used in the main and ancillary tables. The system-maintenance tables (**defaults_device, defaults_user,** and **error_messages**) store user and printer information and system error messages. The relations between tables of the data base are shown in figure 4.

The fields in the **wlog_src** table are listed and described in table 2. The fields in the **intent_src** and **driller** tables are listed and described in tables 3 and 4. A technical description of each field in **wlog_src**, including entry type, width, and template limits, is in table 5. A technical description of each field in the **intent_src** table, including entry type and width limits, is in table 6. No technical description of the **driller** table is given because driller information can only be retrieved, not appended or updated, through WLog. (The NDWR computer-system administrator is responsible for appending and updating the driller table.) A technical description of each field in the lookup tables, including entry type and width limits, is in table 7. Drilling-method codes and descriptions are in table 8. Proposed-use codes and descriptions are in table 9. Site-type codes and descriptions are in table 10. Test-method codes and descriptions are in table 11. Work-type codes and descriptions are in table 12. Tables 5-12 are in the appendix.

Nevada Well Log Data Base
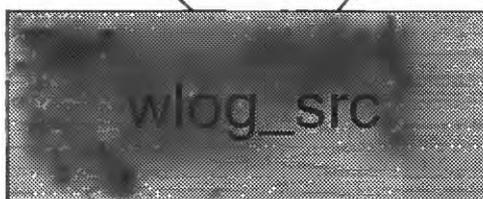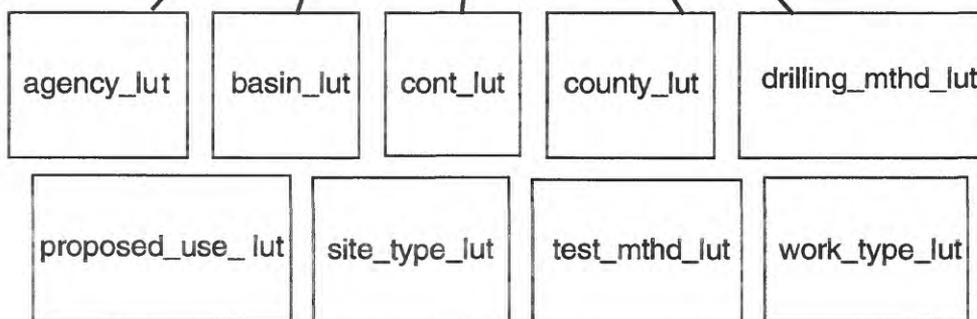
Figure 4. Relations between tables of the well-log data base.

Reports

Users with access levels one and two may invoke several reports for retrieving and organizing notice-of-intent, well-log, and drillers data. Seven reports are currently available for both access levels one and two: (1) "NOTICE-OF-INTENT REPORT" displays the information from the notice-of-intent-to-drill cards required by NDWR to be submitted before drilling; (2) "WELL_DRILLER'S LOG REPORT" displays a single well-log record, range of records, or prints the open records (records that have not been checked for entry error). Open records can only be retrieved by the user who entered the well-log record; (3) "CONTRACTOR REPORT" is currently not used; (4) "DRILLER REPORT" displays information on the drillers; (5) "EXPIRED NOI REPORT" displays the uncompleted notice-of-intent-to-drill cards older than 60 days from date drilled; (6) "GENERAL WELL DRILLERS REPORT" displays well-log information based on user selected criteria; and (7) "LAT/LONG REPORT" displays well-log information based on latitude and longitude location. Two additional restricted reports are available for users with access level one: (a) "WELL DRILLER DATA DUMP," which is similar to the "GENERAL WELL DRILLERS REPORT " but allows for display of all well-log records to date, excluding open and proprietary records, and is formatted to print on 11 inch by 14 inch paper; (b) "RESTRICTED RETRIEVAL" displays all well-log records to date, including open and proprietary records, based on user selected criteria. Reports can be viewed on the screen or sent to a printer.

Table 2. General description of data fields for **wlog_src** table

[Abbreviations: NDWR, Nevada Division of Water Resources; PLSS, Public Land Survey System; USGS, U.S. Geological Survey]

Field name	Description	Additional information
SEQUENCE_NO	Sequence number	Sequence number provides a unique field to link well-log data in the separate tables.
WELL_LOG	Log number	Sequential number of particular Well Driller's Report. Value for this field is assigned automatically for all new sites but can be entered for historical sites.
APP#	Application number	Request for water use (other than domestic or change of an existing use); number is assigned by NDWR at time of filing. After all legal requirements have been satisfied, application may be permitted and subsequently certified.
STATION_ID	Station identification	Identification used by USGS' National Water Information System database.
NOTICE_OF_INTENT	Notice of intent	Number stamped on Notice-of-Intent-to-drill card.
WAIVER_NO	Waiver number	Waiver number assigned by NDWR to a well or wells for exceptions to Nevada State well-drilling regulations.
DATE_LOG_RCVD	Date received	Date when Well Driller's Report was received by NDWR. Date is stamped on front side of original well log.
DATE_LOG_RCVD_ACC	Date received accuracy	Valid codes are Y - date is missing month and day, only accurate to year M - date is missing day, only accurate to month D - date is accurate month, day and year
SITE_TYPE	Site type	Current status of well. Valid codes are N - new E - existing P - proprietary, new (adhere to the following regulation) Y - proprietary, existing (adhere to the following regulation) Proprietary information on geothermal wells drilled within the past 5 years can not be accessed by the public. These wells are determined by the water temperature on the well log (anything above 86 degrees Fahrenheit). As required under Chapter 534A.031 of the Nevada Revised Statutes, exploration and subsurface information obtained as a result of a geothermal project must be filed with the Department of Minerals within 30 days after it is accumulated. The information is confidential for a period of 5 years after the date of filing and may not be disclosed during that time without the express written consent of the operator of the project, except that it must be made available by the Department to the State Engineer or any other agency of the State upon request. The State Engineer or other agency shall keep the information confidential for the required period.
WORK_TYPE	Work type	Type of work that was performed by the driller. Valid codes are D - deepen G - geothermal N - new (enter this value for new sites with one of the following Proposed Uses) O - other (explain in work type remarks) P - plug R - recondition
WORK_TYPE_RMKS	Work type remarks	For work_type = "O", other; comments

Field name	Description	Additional Information

PROPOSED_USE	Proposed use	Indicates the principal use of the water at the site.
		Valid codes are
		   A - air conditioning
		   B - bottling
		   C - commercial
		   D - dewater
		   E - power
		   F - fire
		   H - domestic
		   I - irrigation
		   J - industrial (cooling)
		   K - mining
		   M - medicinal
		   N - industrial
		   P - public supply (municipal)
		   Q - aquaculture
		   R - recreation
		   S - stock
		   T - institution
		   U - unused
		   Y - desalination
		   Z - other (explain in remarks)

DRILLING_METHOD	Drilling method	Method used to drill/construct the well.
		Valid codes are
		   A - air-rotary
		   B - bored or augered
		   C - cable-tool
		   D - dug
		   H - hydraulic rotary (mud)
		   J - jetted
		   P - air percussion
		   R - reverse rotary
		   T - trenching
		   V - driven
		   W - drive and wash
		   Z - other (explain in remarks)

SC	State county code	County in which well is located. County Code County Code Churchill 32001 Lincoln 32017 Clark 32003 Lyon 32019 Douglas 32005 Mineral 32021 Elko 32007 Nye 32023 Esmeralda 32009 Pershing 32027 Eureka 32011 Storey 32029 Humboldt 32013 Washoe 32031 Lander 32015 White Pine 32033 Independent City Code Carson City 32510
HA	Hydrographic area	Based on hydrographic numbering system. See Rush, 1968.
TWN	Township	Location within PLSS township
LEGAL_TWN	Township	Legal format used by NDWR for township, i.e. 16N for Township 16 North.
RNG	Range	Location within PLSS range
LEGAL_RNG	Range	Legal format used by NDWR for range, i.e. 20E for Range 20 East.
SEC	Section	Section number
SEC_QUARTERS	Quarters	Legal description of tract in which site is located recorded on Driller's Log. Abbreviations NE, NW, SE, and SW (upper cased) are used for the quarter (160 acres), quarter-quarter (40 acres), or quarter-quarter-quarter (10 acres) designation. Smallest subdivision is listed first. NE, northeast; NW, northwest; SE, southeast; SW, southwest.

Table 2. General description of data fields for **wlog_src** table --Continued

Field name	Description	Additional information
LEGAL_QUARTERS	Quarters	Legal format used by NDWR for quarters.
QUARTERS_SEQ	Quarter sequence	Sites within smallest subdivision used are numbered sequentially with one digit.
REF	Reference	PLSS reference point
ALTITUDE	Altitude	Average of surrounding ground surface elevation
LATITUDE	Latitude	
LONGITUDE	Longitude	
LAT_LONG_ACC	Latitude and longitude accuracy	Accuracy to which the site has been located denoted by a single character field. Valid codes are F - measurement is accurate to 5 seconds, about 505 feet T - measurement is accurate to 10 seconds, about 1,010 feet M - the measurement is accurate to 1 minute, about 6,060 feet
OWNER_CURRENT	Current owner name	Owner name as shown on original well log.
OWNER_ADDRESS	Owners address	Address of well site
PARCEL_NO	Parcel number	Parcel number as shown on original well log.
SUBDIVISION_NAME	Subdivision name	
DATE_CMPLT	Date completed	Date drilling was completed.
DATE_CMPLT_ACC	Date completed accuracy	Valid codes are: Y - date is missing month and day, only accurate to the year M - date is missing day, only accurate to the month D - date is accurate month, day and year
GRAVEL_PACKED	Gravel packed	Y, yes or N, no. Indicates whether annulus (space between borehole and well casing) surrounding perforated sections has been gravel packed.
DEPTH_SEAL	Depth of seal	Depth to which annulus (space between borehole and well casing) has been sealed.
DEPTH_DRILLED	Depth drilled	Depth to bottom of borehole to the nearest foot
DEPTH_BEDROCK	Depth to bedrock	Depth at which bedrock is encountered.
AQUIFER_DESC	Aquifer type	
DEPTH_CASED	Depth cased	Maximum depth (bottom of last casing interval reported) to which well was cased (completed) to the nearest 1 foot
CSNG_DIAMETER	Casing diameter	Diameter of casing to nearest hundredth of an inch.
CSNG_REDUCTIONS	Casing reductions	Number of times diameter of casing is reduced with depth. Value is zero if single casing diameter is used.
TOP_PERF	Top perforation	Depth to top of first perforated interval, recorded to nearest foot.
BOTTOM_PERF	Bottom perforation	Depth to bottom of last perforated interval, recorded to nearest foot.
PERF_INTERVALS	Perforated intervals	Number of sections of perforated pipe or well screen.
STATIC_WL	Static water level	Depth-to-water measured on well-completion date, prior to pumping the well and recorded to the nearest foot.
TEMPERATURE	Temperature	Temperature of water
YIELD	Yield	Instantaneous rate at which well will produce water, in gallons per minute (GPM).
DRAWDOWN	Drawdown	Pumping water-level minus static water level.
HOURS_PUMPED	Hours pumped	Number of hours that water was continuously withdrawn from well.

Table 2. General description of data fields for **wlog_src** table --Continued

Field name	Description	Additional Information

TEST_METHOD	Test method	Method of construction. Valid codes are
		  A - air lift
		  B - bucket
		  C - centrifugal pump
		  J - jet pump
		  P - piston pump
		  R - rotary
		  S - submergible pump
		  T - turbine
		  U - unknown
		  Z - other (explain in remarks)

QUAL_CONST_DATA	Quality of construction data	Indicates how thoroughly and legibly driller has reported required information describing characteristics of well (excluding lithology) on Well Driller's Report. Valid codes are
		  E - excellent
		  G - good
		  F - fair
		  P - poor
		  N - not reported
		  Z - other (explain in remarks)

QUAL_LITH_DATA	Quality of lithologic data	Indicates how thoroughly and legibly driller has described lithology (types of material encountered) of borehole on Well Driller's Report. Valid codes are
		  E - excellent
		  G - good
		  F - fair
		  P - poor
		  N - not reported
		  Z - other (explain in remarks)

REMARKS	Remarks	
REMARKS_ADDITIONAL	Additional remarks	
CONTRACTOR_LIC_NO	Contractor's license number	Nevada contractor's license number issued by the State Board of Contractors.
CONTRACTOR_NAME	Contractor's name	Name of contractor drilling well
CONTRACTOR_ADDRESS	Contractor's address	Address of contractor drilling well
CONTRACTOR_DRLR_NO	Contractor's driller number	Driller number of contractor drilling well
DRILLER_LIC_NO	Driller's license number	On-site driller's license number issued by NDWR.
PROJECT_NO	Project number	
DATE_FIELD_CHECK	Date field checked	Date on which site was inventoried (physically visited).
SOURCE_AGENCY	Source agency code	Agency or company where Driller's Log information originated. Codes are found in source agency lookup table.
USER_ID	User identification	User identification of individual who entered data.
DATE_ENTRY	Date of entry	Date when record was entered.
UPDATE_USER_ID	Update user id	Login identification of user who is updating record.
DATE_UPDATE	Date of update	Date when record was updated.
EDIT_STATUS	Edit Status	Valid codes are F, Final or O, Open.
WELL_START_DATE	Well start date	Date well drilling was started.
PERF_LENGTH	Perforated Length	Computed automatically by subtracting depth to top of first perforated interval from depth to bottom to last perforated interval.

Table 2. General description of data fields for **wlog_src** table --Continued

Field name	Description	Additional information
PUMPING_WL	Pumping water level	Automatically computed drawdown plus static water level. Maximum depth-to-water observed below land surface (depth at which water-level stabilizes inside casing) while well is pumping (producing water).
SPECIF_CAPACITY	Specific capacity	Yield per unit of drawdown, automatically computed
LOCAL_NO	Local number	Combination of hydrographic area, township, range, section, quarters, and quarter sequence
OWNER_NAME_FWD	Owner name forward	Owner's name will be displayed in view as first, middle initial, last.
GRAVEL_PACK_TOP	Gravel pack top	Top depth (feet) of gravel packed interval
GRAVEL_PACK_BOT	Gravel pack bottom	Bottom depth (feet) of gravel packed interval

Table 3. General description of data fields for **intent_src** table

[Abbreviations: NDWR, Nevada Division of Water Resources; PLSS, Public land survey system; USGS, U.S. Geological Survey]

Field name	Description	Additional information
NOTICE_OF_INTENT	Notice of intent	Number stamped on Notice-of-Intent-to-drill card.
APP#	Application number	Request for water use (other than domestic or change of an existing use); number is assigned by NDWR at time of filing. After all legal requirements have been satisfied, application may be permitted and subsequently certified.
DATE_SUB	Date submitted	Date notice-of-intent card was received by NDWR.
DATE_DRL	Date drilled	Date that well is to be drilled as shown on notice-of-intent-to-drill card.
HA	Hydrographic area	Based on hydrographic numbering system. See Rush, 1968.
TWN	Township	Location within PLSS township
RNG	Range	Location within PLSS range
SEC	Section	Location within PLSS section
SEC_QUARTERS	Quarters	Legal description of the tract in which site is located recorded on Driller's Log. Abbreviations NE, NW, SE, and SW (upper cased) are used for quarter (160 acres), quarter-quarter (40 acres), or quarter-quarter-quarter (10 acres) designation. Smallest subdivision is listed first. NE, northeast; NW, northwest: SE, southeast: SW, southwest.
QUARTERS_SEQ	Quarter sequence	Sites within smallest subdivision used are numbered sequentially with one digit.
REF	Reference	PLSS reference point
OWNER_ADDRESS	Owner's address	
DRILLER_LIC_NO	Driller's license number	License number issued by NDWR.
USER_ID	User identification	Login identification of individual who entered data.
DATE_ENTRY	Date of entry	Date record was entered.
SITE_ADDRESS	Site address	Address of drill site
WAIVER_NO	Waiver number	Waiver number assigned to a well or wells by NDWR for exceptions to Nevada State well-drilling regulations.
LOG_RCVD	Log received	Whether log was received or not.

Table 4. General description of data fields for **driller** table

Field name	Description	Additional information
LNAME	Last name	Last name of driller
FNAME	First name	First name and middle initial of driller
DRILL_NO	Driller number	Assigned by NDWR upon receiving a valid well driller's license
TYPE		Type of well that driller is authorized to drill. Valid codes are M - monitor G - geothermal FP - federal projects P - plugging If blank, type is assumed to be water.
COMPANY		Company driller works for, if applicable
ADDRESS	Business street address of driller	Street address or P. O. Box of driller or company driller works for (if requested instead by driller)
CITY		City of address specified by driller
ST	State	State of address specified by driller
ZIP	Zip code	Zip code of address specified by driller
PHONE	Phone number	Phone number of driller or company driller works for (if requested instead by driller)
CONTRLIC	Contractor's license	Assigned by the State Board of Contractors if driller owns his own drilling equipment
CLASS		Assigned by the State Contractor's Board, usually equal to C23
STATUS	Status of driller license	Active or expired

Interface Screens

The user, depending upon access level, performs data appends, updates, and retrievals or produces reports through a series of interface screens. The main menu for each access level displays the set of menu options available to the user (see figs. 1-3).

Data Append, Update, and Retrieve Menu Options

Data append is used to add a new record; data update is used to change an existing record. Only users with access level one can append or update data. Data retrieve is used to display data without the ability to update the data. Users with access level one or two can retrieve data. Data in the WLog is appended, updated, and retrieved through the following main menu options:

Option A1 - NOTICE OF INTENT. The user can append, update, or retrieve notice-of-intent information.

Option A2 - WELL DRILLER'S LOG. The user can append, update, or retrieve well-log information.

Option A3 - CONTRACTOR. This option currently is not used for accessing contractor information; it could be used in future versions of the system.

Option A4 - DRILLER. The user can retrieve driller information.

The data for appending or updating are displayed on a series of three screen pages. These screens are shown in figures 5-7. The interface screens guide the user through the data available for a specific well-log record. Retrieved data is also displayed in a series of three screen pages. These screens are shown in figures 8-10. The notice-of-intent form is shown in figure 11.

```
┌DATE: 08/04/95──────────────WELL DRILLER'S LOG DATA BASE────── APPEND ─PAGE 1──
  SEQUENCE NUMBER:              APP. NO.:   -      -          LOG NUMBER:           1
                                                             (Enter -9 to incremnt))

  STATION NUMBER: _____
  NOTICE OF INTENT NO.: ███████     WAIVER NO.: _____
  DATE NOTICE RCVD BY NDWR: _____  ACCURACY OF DATE: _
  SITE TYPE: ██ █  WORK TYPE: ██ █  PROPOSED USE: ██ █  DRILLING METHOD: ██ █

  STATE/COUNTY: ███████ █  COUNTY NAME:            STATE:
  HYDRO. AREA CODE: █████ █ HYDRO. AREA NAME: _____

  TOWNSHIP: ____  RANGE: ____  SECTION: __ QUARTERS: ____ SEQ. NO.: _ REF: ____
  PARCEL NO.: _____      SUBDIVISION NAME: _____
  LAND ALTITUDE: _____ (8.2)
  LATITUDE: ██████   LONGITUDE: ██████  LAT/LONG ACCURACY: _

  CURRENT OWNER: _____                              (Last,First)
  OWNER ADDRESS AT WELL: _____

  REMARKS FOR TYPE OF WORK: _____

               ?= Lookup field, [REVERSE]= mandatory
  Go(F9)   Pop_lat&ha   Chng_app  Lookup_fld  2Page  3Page  >  : █
```

Figure 5. Page one for append/update. Screen is similar when in update mode.

```
┌DATE: 08/04/95──────────────WELL DRILLER'S LOG DATA BASE────── APPEND ─PAGE 2──
  SEQUENCE NUMBER: -999999999  APP. NO.:   -      -          LOG NUMBER:        9

  WELL-COMPLT DATE: _____      WELL-START DATE: _____   ACCURACY OF DATE: _
  GRAVEL PACKED: Y      FROM: _____      TO: ____
  DEPTH OF SEAL: ____   DEPTH OF HOLE: ____
  DEPTH TO BEDROCK: ____  AQUIFER DESCRIPTION: ____
  DEPTH CASED: ____     TOP CASING DIAMETER: ____ (5.2)  CASING REDUCTIONS: __
  TOP OF PERF.: ____    BOTTOM OF PERF.: ____       PERFORATED INTERVALS: 11

   STATIC WATER LEVEL: _____(6.1)   TEMPERATURE: ____(5.1)  TEMP. SCALE: █
   YIELD: _____(7.1)                DRAWDOWN: _____(6.1)
   HOURS DEVELOPED: _____(6.2)      DEVELOPMENT METHOD: _ █

     QUALITY OF CONSTRUCTION DATA: █      QUALITY OF LITHOLOGIC DATA: █

   GENERAL REMARKS: _____

               ?= Lookup field, [REVERSE]= mandatory
  Lookup_fld  1Page  3Page  Help(F2)  : █
```

Figure 6. Page two for append/update. Screen is similar when in update mode.

Figure 7. Page three for append/update. Screen is similar when in update mode.

Figure 8. Page one for example query.

```
DATE: 08/04/95                 WELL DRILLER'S LOG DATA BASE        RETRIEVE PAGE 2
  SEQUENCE NUMBER: 20867            APP. NO.:  -     -        LOG NUMBER:   45122


WELL-COMPLT DATE: 02/03/1994  WELL-START DATE: _____    ACCURACY OF DATE: D
GRAVEL PACKED: Y          FROM: ____            TO: ____
DEPTH OF SEAL:    3       DEPTH OF HOLE:    20
DEPTH TO BEDROCK: _____   AQUIFER DESCRIPTION: _____
DEPTH CASED:    20        TOP CASING DIAMETER: 2.38      CASING REDUCTIONS: _
TOP OF PERF.:    5        BOTTOM OF PERF.:    20         PERFORATED INTERVALS: 1

  STATIC WATER LEVEL:    8.0          TEMPERATURE: _____      TEMP. SCALE: █
  YIELD: _____                      DRAWDOWN: _____
  HOURS DEVELOPED: _____            DEVELOPMENT METHOD: _


      QUALITY OF CONSTRUCTION DATA: G      QUALITY OF LITHOLOGIC DATA: G


   GENERAL REMARKS: PROP USE=MONITOR OWNR NO=MW5



 1Page  3Page  Help(F2)  : █
```

Figure 9. Page two for example query.


```
DATE: 08/04/95                 WELL DRILLER'S LOG DATA BASE        RETRIEVE PAGE 3
  SEQUENCE NUMBER: 20867            APP. NO.:  -     -        LOG NUMBER:   45122

  CONTRACTOR'S LICENSE NO.: _____    NAME: THOMAS HIGH
     ADDRESS: 4670 S POLARIS AVE LAS VEGAS NV
  CONTRACTOR'S DRILLER'S LICENSE NO.: _____
  DRILLER'S LICENSE NO.: 1869          NAME: HIGH, THOMAS R.
     ADDRESS: 4670 SOUTH POLARIS AVE., LAS VEGAS, NV 89103

   USGS PROJECT NO.: _____        DATE FIELD CHECKED: _____

  ADDITIONAL REMARKS: _____


  SOURCE AGENCY FOR LOG INFORMATION: NV003
  AGENCY NAME: DIV-WATER RESO, NEVADA DEPT-CONS & NAT RESO, NV

  EDIT STATUS: F  (F=Final, O=Open)

        USER ID: ebauer          DATE OF DATA ENTRY: 09/26/1994
        UPDATE USER ID: ebauer   DATE OF DATA UPDATE: 10/05/1994


 1Page  2Page  Help(F2)  : █
```

Figure 10. Page three for example query.

Figure 11. Notice-of-intent form.

Data Report Menu Options

Reports are accessed by the following menu options:

Option B1 - "NOTICE-OF-INTENT REPORT." The "NOTICE-OF-INTENT REPORT" column headings are shown in figure 12. The user can retrieve notice-of-intent records from a specific township and range, or can retrieve all notice-of-intent records.

Option B2 - "WELL-DRILLER'S LOG REPORT." The "WELL-DRILLER'S LOG REPORT" column headings are shown in figure 13. The user can retrieve a single record, a single open record, or a series of open records. Open records are records for which data for a particular well log has been entered, but not yet checked for data-entry errors. Open records can only be retrieved by the user who entered the well-log record.

Option B3 - "CONTRACTOR REPORT." The "CONTRACTOR REPORT" is not implemented at this time. It could be used in future versions of the system.

Option B4 - "DRILLER REPORT." The "DRILLER REPORT" column headings are shown in figure 14. In addition, the driller's address and phone number, if given, are printed on the following line. The user can retrieve data on the basis of the driller status or can retrieve data on all the drillers. The report is sorted by driller's name.

Option B5 - "EXPIRED NOI REPORT." The "EXPIRED NOI REPORT" column headings are shown in figure 15. The report lists all uncompleted notices older than 60 days from the date drilled. The report is sorted by notice-of-intent number.

Option B6 - "GENERAL WELL DRILLERS REPORT." The "GENERAL WELL DRILLERS REPORT" input screen is shown in figure 16. The user must specify at least one selection criterion for data retrieval, such as location, owner, start and end date, proposed use, etc. The data base will retrieve all non-proprietary final records that match all criteria the user selected. Output headings for the resulting report are shown in figure 17.

Option B7 - "WELL DRILLER DATA DUMP." The input screen and report output headings for the "WELL DRILLER DATA DUMP" are identical to those for Option B6, the "GENERAL WELL DRILLERS REPORT." In option B6, a user must specify at least one search criterion. If no search criteria are specified in option B7, all well-log records to date, except proprietary and open records, will be retrieved and the report will be formatted for 11 inch by 14 inch paper.

Option B8 - "RESTRICTED RETRIEVAL." The input screen and report-output headings for the "RESTRICTED RETRIEVAL" are identical to those for Option B6, the "GENERAL WELL DRILLERS REPORT." In Option B8, a user must have an access level of one to retrieve proprietary and open records. The user has the option of specifying selection criteria or leaving the input screen blank and retrieving all records to date.

Option B9 - "LAT/LONG REPORT." The "LAT/LONG REPORT" input screen is shown in figure 18. It is similar to Option B6 "GENERAL WELL DRILLERS REPORT" in that the user must specify at least one selection criterion for data retrieval, but, the user can also specify a minimum and maximum latitude and longitude. This allows for well-log data retrieval for a four-sided area. Output headings for the resulting report are shown in figure 19.

Notices of Intent

Notice of Intent	Applicatn Number	Date Notice Submitted	Date Drilled	Hydro Basin	Twn	Rng	Sec	Qrtr	Seq	Ref	Drllr Lic No	User ID	Entry Date
2771		03/16/95	03/17/95	61	N36	E50	30	BA		MD	1410	mdillon	03/16/95
22949	58355	04/20/95	04/19/95	61	N36	E50	19	DA		MD	1616	mdillon	04/21/95
22951	55141	04/20/95	04/19/95	61	N36	E50	19	AC		MD	1616	mdillon	04/21/95
22956	58355	04/20/95	04/19/95	61	N36	E50	20	CB		MD	1616	mdillon	04/21/95
27757	55140	02/14/95	02/15/95	61	N36	E50	19	DB		MD	1410	mdillon	02/16/95

Figure 12. Column headings for report B1, Notice-of-Intent Report.

```
PRINTED BY: ebauer                                              RUN DATE: 05/26/95
                          Well Driller's Log Database-Report

Type of Site N                                              Log No.          45122
Keypunched by: ebauer    09/26/94  Updated by: ebauer   10/05/94   Permit No.
Date Received by NDWR 02/25/1994  Date Acc. D               Basin 212

Sequence No. 20867
                                                     Notice of Intent No. 12155
Owner DAVE MASON/GAUDIN FORD
Mailing Address/Well Address 4TH ST & LAS VEGAS BLVD
Location BA        Sec. 03        T 521       R E61      Ref: MD    State/Co. Code 32003

Waiver No. MO-2395  Parcel No. 040-270-002      Subdiv. Name


        Type of Work N               Proposed Use Z       Type of Well B

                                                     WELL CONSTRUCTION
                                                     Hole Depth 20     feet

Latitude 360925    Longitude 1150849
Lat-long Accuracy T                                  Casing Diameter:
                                              2.38   inches to 20     feet
                                                     Casing Reductions

Source Agency NV003
                                                  Perforations:
Altitude
                                                  from 5    feet to 20    feet
Depth to Bedrock                                          Perforation Length 15
                                                          Perforation Intervals 1

Construction Data Quality G                       Depth of Seal 3   feet
Lithologic Data Quality G                         Gravel Packed Y
                                                  from       feet to      feet
Aquifer Type:
                                                  Static Water Level 8.0    ft blw LSD
                                                  Water Temperature       deg F
Date Started
Date Completed 02/03/1994  Date Acc. D
Yield       G.P.M.                                Name THOMAS HIGH
                                                  Address 4670 S POLARIS AVE LAS
                                                          VEGAS NV

Draw Down              After Hours Pump           Contractor Lic. No.

Pumping Water Level                               Contractor's Drlr No.
Specific Capacity
                                                  Driller Lic. No.   1869
Method
Project No.

Work Type Remarks:

General Remarks:  PROP USE=MONITOR OWNR NO=MW5

Additional Remarks:

Edit Status: F
```

Figure 13. Column headings for report B2, Well-Driller's Log Report.

Driller Lookup Table
Sorted by Driller's Name

Last name	First name	License number	Type	Contrlc	Class	Status		
ALLEN	O.D.	200 WOODROW			TAFT	W-DRAWN	CA	93268
BAILES	WILLIAM O.	3215 CINDER LANE			LAS VEGAS	W-DRAWN	NV	89103
COLEMAN	RANDY WAYNE	HS-9 QA DIVISION			FPO NEW YORK	W-DRAWN	NY	09501
HAYES	MELVIN	200 WOODROW			TAFT	W-DRAWN	CA	93268
HORST	BRUCE RUSSELL	4963 HALL RD.			SANTA ROSA	W-DRAWN	CA	95401

Figure 14. Column headings for report B4, Driller's Report.

Expired Notices of Intent
(Uncompleted notices older than 60 days from date drilled)

Notice of Intent	Applicatn Number	Date Notice Submitted	Date Drilled	Hydro Basin	Twn	Rng	Sec	Qrtr	Seq	Ref	Drllr Lic No	User ID	Entry Date?
2771		03/16/95	03/17/95	61	N36	E50	30	BA		MD	1410	mdillon	03/16/95
2874		04/20/95	03/20/95	101	N18	E28	16	CB		MD	772	mdillon	04/21/95
8253		03/17/95	03/16/95	153	N21	E53	10	AD		MD	635	mdillon	03/17/95
8254	24262	03/22/95	03/17/95	153	N21	E53	09	BC		MD	635	mdillon	03/22/95
11071		01/18/95	01/16/95	61	N35	E50	02	CB		MD	1631	mdillon	02/16/95

Figure 15. Column headings for report B5, Expired NOI Report.

WLOG - WELL DRILLERS LOG DATABASE
GENERAL RETRIEVAL REPORT

Basin   IN   Ex. '44'; '1'
Township   IN   Ex. 'N36'
Range   IN   Ex. 'E20'
Section   IN   Ex. '12'

Owner   LIKE   Ex. 'KAUFMAX'

Start Date Cmplt IN   End Date Cmplt   Ex. 05/01/1991
Proposed Use   IN   Ex. 'H','I','R'
Parcel No   IN   Ex. '64-2'
Work Type   IN   Ex. 'N'
Driller Lic. No. IN   Ex. '1234'

NOTE: All entries, except Date, MUST be enclosed in single quotes with
multiple entries (not allowed for Owner) separated by a comma. Wildcards can
be used only for Owner: - for one char match, % for multi char match.

Enter Go Main : █

Figure 16. Data-input screen for report B6, General Well Drillers Report.

Selection Criteria: OWNER_CURRENT LIKE KAUFMAX
Total number of records: NUMB4

HYDR BASN NO.	TOWNSHIP RANGE SECTION AND QUARTER SECTION			OWNER	DATE COMPLETED	LOG NO.	DRLRS. LIC. NO.	TOTAL DEPTH	STATIC WATER LEVEL	CSNG. DIAM.	ASSESSORS PARCEL NUMBER	WORK TYPE	PROP USE	PERMIT/ WAIVER NUMBER
44	N36	E56	36 BD	KAUFMAN, KENNETH	05/27/94	0	1584	270	134.0	6.62	64-2	N	H	
44	N36	E56	36 BD	KAUFMAN, KENNETH	05/27/94	44803	1584	270	134.0	6.62	64-2	N	H	
162	S19	E53	33 AD	KAUFMAN, MORRIS	02/22/92	36337	1642	140	54.0	8.62	29-842-16	N	H	
162	S19	E53	34 BD	KAUFMAN, MORRIS	06/02/92	38396	1642	140	70.0	8.62	29-852-17	N	H	

Total number of records: 4

Figure 17. Column headings for report B6, Well Driller Data.

```
WLOG - WELL DRILLERS LOG DATABASE
         LATITUDE/LONGITUDE REPORT

Basin        IN  _____                         Ex. '44','1'
Township     IN  _____                         Ex. 'N36'
Range        IN  _____                         Ex. 'E20'
Section      IN  _____                         Ex. '12'

Latitude Min.  _____  Latitude Max.  _____     Ex. '360900'
Longitude Min. _____  Longitude Max. _____     Ex. '1150800'
Start Date Cmplt _____  End Date Cmplt _____      Ex. 05/01/1991
Proposed Use      IN  _____                       Ex. 'H','I','R'
Parcel No         IN  _____                       Ex. '64-2'
Work Type         IN  _____                       Ex. 'N'
Driller Lic. No.  IN  _____                       Ex. '1234'

NOTE: All entries, except Date, MUST be enclosed in single quotes with
multiple entries (not allowed for Owner) separated by a comma. Wildcards can
be used only for Owner; _ for one char match, % for multi char match.

         Enter  Go  Main : □
```

Figure 18. Data input screen for report B9, Lat/Long Report.

Selection Criteria: HA IN (44)
Total number of records: NUMB266

HYDR BASN NO.	TOWNSHIP RANGE SECTION QUARTER SECTION	LATITUDE	LONGITUDE	DATE COMPLETED	LOG NO.	DRLRS LIC. NO.	TOTAL DEPTH	STATIC WATER LEVEL	CSNG. DIAM.	ASSESSORS PARCEL NUMBER	WORK TYPE	PROP USE	PERMIT/ WAIVER NUMBER
44	N35 E54 11 AB	405628	1155130	02/20/94	43874	1584	166	105.0	6.00		N	H	
44	N35 E56 01 AA	405716	1153613	02/18/88	29605	632	250		6.62		N	H	51993
44	N35 E57 02 DB	405651	1153049	09/14/89	34929	904	290	91.0	6.00		N	S	47124
44	N35 E57 03 CD	405637	1153214	02/19/85	25870	1325	280				N	Z	47124
44	N35 E57 03 CD	405637	1153214	05/07/85	25828	1395	320	6.0	6.00	05-520-16-8	N	N	47124

Figure 19. Column headings for report B9, Lat/Long Report.

REFERENCES CITED

Nevada Division of Water Resources, 1990, Regulations for water well and related drilling: Nevada Division of Water Resources, 72 p.

Rush, F.E., 1968, Index of hydrographic areas in Nevada: Nevada Division of Water Resources, Information Report 6, 38 p.

Shamberger, H.A., 1991, Evolution of Nevada's water laws, as related to the development and evaluation of the State's water resources, from 1866 to about 1960: Nevada Division of Water Resources, Bulletin 46, 100 p.

(page 23 follows)

APPENDIX

Table 5. Field description for well log (**wlog_src**) data-base table

[Abbreviations: #, numeric column of 0 to 9; a, alphanumeric column of A to Z or 0 to 9; a, alphanumeric column of A to Z or 0 to 9; a...., repeat of alpha character up to width of field; c, character column of A to Z or blank or space as specified by template limits; mm/dd/yyyy, date in month/day/year format]

Field name	Data type	Entry width	Entry template	Template limits	Current default	Required field	Entry page number
SEQUENCE_NO	integer	10	########c	Greater than zero	max + 1	yes	1
WELL_LOG	integer	6	######	Greater than zero	if new: max + 1	yes	1
APP#	char	10	b####aa##	b = V,R,J,0 to 9 aa= A to Z,# or (A to F,G, N,P,R,V,W)		yes	1
STATION_ID	char	15	#...	Greater than zero		no	1
NOTICE_OF_INTENT	integer	6	######	Greater than zero		yes	1
WAIVER_NO	char	15	a...			no	1
DATE_LOG_RCVD	date		mm/dd/yyyy	After 10/1/1984 and before today		no	1
DATE_LOG_RCVD_ACC	char	1	c	Y, Year; M, Month; D, Day	D	no	1
SITE_TYPE	char	1	c	See Table 10 for list of site-type codes	N	yes	1
WORK_TYPE	char	1	c	See Table 12 for list of work-type codes	N	yes	1
WORK_TYPE_RMKS	var-char	99	a...			no	1
PROPOSED_USE	char	1	c	See Table 9 for list of proposed-use codes		yes	1
DRILLING_METHOD	char	1	c	See Table 8 for list of drilling-methods codes		yes	1
SC	char	5	#####			yes	1
HA	char	4	###c	### = 1 to 232 c = A to D		yes	1
TWN	char	4	b##c	## = 01 to 48 b = N, S c = H or blank		yes	1
RNG	char	4	b##c	## = 18 to 71 b = E c = H or blank		yes	1
SEC	char	2	##	## = 01 to 36		no	1
SEC_QUARTERS	char	4	cccc	c = A to D		no	1
QUARTERS_SEQ	char	1	#	# = 1 to 9		no	1
REF	char	3	ccc	MD, Mount Diablo; SB, San Bernardino; W, Willamette; GSR, Gila and Salt River; B, Boise	MD	yes	1

Table 5. Field description for well log (wlog_src) data-base table --Continued

Field name	Data type	Entry width	Entry template	Template limits	Current default	Required field	Entry page number
ALTITUDE	float	8	#####.##	Between 400 and 13140		no	1
LATITUDE	integer	5	#####	Between 350000 and 420000		yes	1
LONGITUDE	integer	6	######	Between 1140000 and 1200000		yes	1
LAT_LONG_ACC	char	1	c	S, 1 second, all 4 quarters defined; F, 5 seconds, 3 quarters defined; T, 10 seconds, 2 quarters defined; M, 1 minute, 0 or 1 quarter defined	T	yes	1
OWNER_CURRENT	varchar	50	a...			no	1
OWNER_ADDRESS	varchar	30	a...			no	1
PARCEL_NO	char	15	a...			no	1
SUBDIVISION_NAME	varchar	30	a...			no	1
DATE_CMPLT	date		mm/dd/yyyy	After 01/1/1900 and before today		no	2
DATE_CMPLT_ACC	char	1	c	Y, Year; M, Month; D, Day	D	no	2
GRAVEL_PACKED	char	1	c	Y, Yes; N, No	Y	yes	2
DEPTH_SEAL	integer	3	###	Greater than 0		no	2
DEPTH_DRILLED	integer	5	#####	Greater than 0		no	2
DEPTH_BEDROCK	integer	5	#####	Greater than 0		no	2
AQUIFER_DESC	char	8	c...			no	2
DEPTH_CASED	integer	5	#####	Greater than 0		no	2
CSNG_DIAMETER	float	5	##.##	Greater than 0		no	2
CSNG_REDUCTIONS	integer	2	##		0	yes	2
TOP_PERF	integer	5	#####	Must be less than BOTTOM_PERF		no	2
BOTTOM_PERF	integer	5	#####	Greater than 0		no	2
PERF_INTERVALS	integer	2	##		1	yes	2
STATIC_WL	float	5	####.#	Negative values indicate flowing well. Value of -99999 indicates a flow well of unknown height.		no	2
TEMPERATURE	float	4	###.#	Between 30 and 213		no	2
YIELD	float	6	#####.#			no	2

Table 5. Field description for well log (**wlog_src**) data-base table --Continued

Field name	Data type	Entry width	Entry template	Template limits	Current default	Required field	Entry page number
DRAWDOWN	float	6	####.#			no	2
HOURS_PUMPED	float	6	###.##			no	2
TEST_METHOD	char	1	c	See Table 11 for list of test-method codes		no	2
QUAL_CONST_DATA	char	1	c	E, excellent; G, good; F, fair; P, poor; N, not reported; Z, other	G	yes	2
QUAL_LITH_DATA	char	1	c	E, excellent; G, good; F, fair; P, poor; N, not reported; Z, other	G	yes	2
REMARKS	var-char	99	a...			no	2
REMARKS_ADDITIONAL	var-char	99	a...			no	2
CONTRACTOR_LIC_NO	char	8	a...			no	3
CONTRACTOR_NAME	var-char	30	a...			no	3
CONTRACTOR_ADDRESS	var-char	50	a...			no	3
CONTRACTOR_DRLR_NO	integer	5	####			no	3
DRILLER_LIC_NO	integer	5	a...			no	3
PROJECT_NO	char	12	a...			no	3
DATE_FIELD_CHECK	date		mm/dd/yyyy	After 01/1/1900 and before today		no	3
SOURCE_AGENCY	char	5	c...		NV003	yes	3
USER_ID	char	8	c...	Valid users determined by table defaults_user		yes	3
DATE_ENTRY	date		mm/dd/yyyy	After 10/1/1984 and before today	today	yes	3
UPDATE_USER_ID	char	8	c...	Valid users determined by table defaults_user		yes	3
DATE_UPDATE	date		mm/dd/yyyy	After 10/1/1984 and before today	today	yes	3
EDIT_STATUS	char	1	c	F, Final; O, Open	O	yes	3
WELL_START_DATE	date		mm/dd/yyyy	After 10/1/1984 and before today		no	2
GRAVEL_PACK_TOP	integer	4	####	Greater than zero		no	2
GRAVEL_PACK_BOT	integer	4	####	Greater than zero		no	2

Table 6. Field description for notice-of-intent (**intent_src**) data-base table

[Abbreviations: #, numeric column of 0 to 9; a, alphanumeric column of A to Z or 0 to 9; a...., repeat of alpha character up to width of field; c, character column of A to Z or blank or space as specified by template limits; mm/dd/yyyy, date in month/day/year format]

Field name	Data type	Entry width	Entry template	Template limits	Current default	Required field
NOTICE_OF_INTENT	integer	6	######	Greater than 0		yes
APP#	char	10	b#####cc##	b = V,R,J,0 to 9 cc= A to Z,0 to 9 or (A to F,G, N,P, R,V,W)		no
DATE_SUB	date		mm/dd/yyyy	After 01/1/1900 and before today	today	yes
DATE_DRL	date		mm/dd/yyyy	After 01/1/1900 and before today		no
HA	char	4	###c	### = 1 to 232 c= A to D		no
TWN	char	4	b##c	## = 01 to 48 b = N, S c = H or blank		no
RNG	char	4	b##c	## = 18 to 71 b = E, W c = H or blank		no
SEC	char	2	##	## = 01 to36		no
SEC_QUARTERS	char	4	cccc	c = A to D		no
QUARTERS_SEQ	char	1	#	# = 1 to 9		no
REF	char	3	ccc	MD, Mount Diablo; SB, San Bernardino; W, Williamette; GSR, Gila and Salt River; B, Boise		no
OWNER_ADDRESS	var-char	50	a...			no
DRILLER_LIC_NO	integer	5	a...			no
USER_ID	char	8	c...	Valid users determined by table defaults_user		yes
DATE_ENTRY	date		mm/dd/yyyy	After 10/1/1984 and before today	today	yes
SITE_ADDRESS	var-char	50	a...			no
WAIVER_NO	char	10	a...			no
LOG_RCVD	char	1	a			no

Table 7. General description for lookup tables

Field name	Description	Additional information
agency_lut		
SOURCE_AGENCY	Source agency code	Agency or company where Driller's Log information originated. Codes were previously established by USGS to comply with their national data base
SOURCE_NAME	Full name of agency code	
basin_lut		
HA	Hydrographic area	Based on hydrographic numbering system. See Rush, 1968.
BASIN	Hydrographic basin	Same number as HA, but with leading zeros to complete a three digit code
BASIN_NAME	Basin name	Actual name of the basin
BASIN_STATUS	Basin status	Status of basin regarding water rights, as ordered by the State Engineer. Basin status is either designated or nondesignated.

Table 7. General description for lookup tables--Continued

Field name	Description	Additional information
REGION	Region	Code for hydrographic region. NDWR has defined 14 hydrographic regions generally based on major hydrologic drainage areas, which are further subdivided into hydrographic areas for water planning and management purposes.
REGION_NAME	Region name	
cont_lut		
CONTRACTOR_LIC_NO	Contractor's license number	Issued by the State Board of Contractors
CONTRACTOR_NAME	Contractor's name	Name of contractor drilling well
CONTRACTOR_ADDRESS	Contractor's address	Address of contractor drilling well
county_lut		
SC	State and county code	First two numbers are state code, last three numbers are county code
COUNTY	County	Two character county code
COUNTY_NAME	County name	Full county name
MIN_LAT	Minimum latitude	Display capability for GIS; currently not used.
MAX_LAT	Maximum latitude	Display capability for GIS; currently not used.
MIN_LONG	Minimum longitude	Display capability for GIS; currently not used.
MAX_LONG	Maximum logitude	Display capability for GIS; currently not used.
STATE_AB	State abbreviation code	Two character state abbreviation code
STATE_CODE	State code	Two digit numeric code
COUNTY_CODE	County code	Three digit numeric code
drilling_mthd_lut		
DRILLING_METHOD	Drilling method	Single character code to indicate method used to drill well
DRILLING_METHOD_DESC	Drilling-method description	Full description of single character drilling-method code
proposed_use_lut		
PROPOSED_USE	Proposed use	Single character code to indicate principal use of water at site
PROPOSED_USE_DESC	Proposed-use description	Full description of single character proposed-use code
site_type_lut		
SITE_TYPE	Site type	Single character code to indicate the current status of well
SITE_TYPE_DESC	Site-type description	Full description of single character site-type code
test_mthd_lut		
TEST_METHOD	Test method	Single character code to indicate method of construction
TEST_METHOD_DESC	Test-method description	Full description of single character test-method code
work_type_lut		
WORK_TYPE	Work type	Single character code to indicate type of work that was performed by driller
WORK_TYPE_DESC	Work-type description	Full description of single character work-type code

Table 8. Codes for drilling methods used in drilling_mthd_lut

Drilling-method code (DRILLING_METHOD)	Drilling-method description (DRILLING_METHOD_DESC)
A	Air rotary
B	Bored or augered
C	Cable tool
D	Dug
H	Hydraulic rotary-mud
J	Jetted
P	Air percussion
R	Reverse rotary
T	Trenching
V	Driven
W	Drive and wash
Z	Other (explain in remarks)

Table 9. Codes for proposed use used in proposed_use_lut

Proposed-use code (PROPOSED_USE)	Proposed-use description (PROPOSED_USE_DESC)
A	Air conditioning
B	Bottling
C	Commercial
D	Dewater
E	Power
F	Fire
H	Domestic
I	Irrigation
J	Industrial-cooling
K	Mining
M	Medicinal
N	Industrial
P	Public sup-municipal
Q	Aquaculture
R	Recreation
S	Stock
T	Institution
U	Unused
Y	Desalination
Z	Other (explain in remarks)

Table 10. Codes for site type used in site_type_lut

Site-type code (SITE_TYPE)	Site-type description (SITE_TYPE_DESC)
E	Existing (deepen)
N	New
P	Proprietary-new
Y	Proprietary-existing

Table 11. Codes for test method used in test_mthd_lut

Test-method code (TEST_METHOD)	Test-method Description (TEST_METHOD_DESC)
A	Air lift
B	Bucket
C	Centrifugal pump
J	Jet pump
P	Piston pump
R	Rotary
S	Submergible pump
T	Turbine
U	Unknown
Z	Other (explain in remarks)

Table 12. Codes for work type used in work_type_lut

Work-type code (WORK_TYPE)	Work-type description (WORK_TYPE_DESC)
D	Deepen
G	Geothermal
N	New
O	Other (explain in remarks)
P	Plug or abandonment
R	Recondition
T	Test